



Building Division

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**2012 WSEC & IRC Ventilation (Effective July 1, 2013)
Residential Buildings Prescriptive Compliance Form**

This set of forms has been developed to assist permit applicants documenting compliance with the 2012 energy and ventilation codes. The following forms provide much of the required documentation for plan review. The details noted here must also be shown on the drawings.

WSEC Table R402.1.1: Insulation and Fenestration Requirements by Component

Climate Zone	Marine 4	
	R-Value ^a	U-Factor ^a
Fenestration U-Factor ^b	n/a	0.30
Skylight U-Factor	n/a	0.50
Glazed Fenestration SHGC ^{b,e}	n/a	n/a
Ceiling	49 ^j	0.026
Wood Frame Wall ^{g,k,l}	21 int	0.056
Mass Wall R-Value ⁱ	21/21 ^h	0.056
Floor	30 ^g	0.029
Below Grade Wall ^{c,k}	10/15/21 int + TB	0.042
Slab ^d R-Value & Depth	10, 2 ft	n/a

WSEC Chapter 2 Definitions

Fenestration: includes products with glass and nonglass glazing materials.

SHGC: Solar Heat Gain Coefficient

WSEC Table R402.1.1 Footnotes

For SI: 1 foot = 304.8 mm, ci = continuous insulation, int = intermediate framing.

^a R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the compressed R-value of the insulation from Appendix Table A101.4 shall not be less than the R-value specified in the table.

^b The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

^c "10/15/21.+TB" means R-10 continuous insulation on the exterior of the wall, or R-15 continuous insulation on the interior of the wall, or R-21 cavity insulation plus a thermal break between the slab and the basement wall at the interior of the basement wall. "10/15/21.+TB" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the wall. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. "TB" means thermal break between floor slab and basement wall.

^d R-10 continuous insulation is required under heated slab on grade floors. See R402.2.9.1.

^e There are no SHGC requirements in the Marine Zone.

^f Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

^g Reserved.

^h First value is cavity insulation, second is continuous insulation or insulated siding, so "13.+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used to maintain a consistent total sheathing thickness.

ⁱ The second R-value applies when more than half the insulation is on the interior of the mass wall.

^j For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38.

^k Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.

^l Log and solid timber walls with a minimum average thickness of 3.5 inches are exempt from this insulation requirement.

Table R402.1.3 Footnote

^a Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source or as specified in Section R402.1.3.

Radiant Slab:

R-10 foam insulation, continuous with thermal break (WSEC R402.2.9, Table R402.1.1)

Lighting Efficiency:

1. **Mandatory:** A minimum of 75 percent of all light fixtures will be high efficacy. (WSEC R404.1)

Glazing Schedule (on pages 7 of this document)

Please check the box in front of the option which you will use to meet the requirements:

- 1. Area weighted window, skylight or door U-factor (WSEC R402.1.4)
- 2. Glazing Schedule does not apply when using the prescriptive Table R402.1.1 shown on page 1 of this form.

WSEC Section R406 Additional Energy Efficiency Requirements

Each dwelling unit in one and two-family dwellings and townhouses, as defined in Section 101.2 of the International Residential Code shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits:

- 1. **Small Dwelling Unit: 0.5 points**
Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building that are less than 750 square feet of heated floor area.
- 2. **Medium Dwelling Unit: 1.5 points**
All dwelling units that are not included in #1 or #3, including additions over 750 square feet.
- 3. **Large Dwelling Unit: 2.5 points**
Dwelling units exceeding 5000 square feet of conditioned floor area.

Table R406.2 Summary

Option	Description	Credit(s)	Check Selected Credit	Credit(s)
1a	Efficient Building Envelope 1a	0.5		
1b	Efficient Building Envelope 1b	1.0		
1c	Efficient Building Envelope 1c	2.0		
2a	Air Leakage Control and Efficient Ventilation 2a	0.5		
2b	Air Leakage Control and Efficient Ventilation 2b	1.0		
2c	Air Leakage Control and Efficient Ventilation 2c	1.5		
3a	High Efficiency HVAC 3a	0.5		
3b	High Efficiency HVAC 3b	1.0		
3c	High Efficiency HVAC 3c	2.0		
3d	High Efficiency HVAC 3d	1.0		
4	High Efficiency HVAC Distribution System	1.0		
5a	Efficient Water Heating	0.5		
5b	Efficient Water Heating	1.5		
6	Renewable Electric Energy	0.5	*1200 kwh	

Total Credits

*see pages 3 and 4 for the full table descriptions.

WASHINGTON STATE ENERGY CODE, RESIDENTIAL PROVISIONS

TABLE 406.2 -- ENERGY CREDITS (DEBITS)

OPTION	DESCRIPTION	CREDIT(S)
1a	<p>EFFICIENT BUILDING ENVELOPE 1a: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U . = 0.28 Floor R-38 Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total UA by 5%.</p>	0.5
1b	<p>EFFICIENT BUILDING ENVELOPE 1b: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U . = 0.25 Wall R-21 plus R-4 Floor R-38 Basement wall R-21 int plus R-5 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total UA by 15%.</p>	1.0
1c	<p>EFFICIENT BUILDING ENVELOPE 1c: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U . = 0.22 Ceiling and single-rafter or joist-vaulted R-49 advanced Wood frame wall R-21 int plus R-12 ci Floor R-38 Basement wall R-21 int plus R-12 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total UA by 30%.</p>	2.0
2a	<p>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2a: Compliance based on R402.4.1.2: Reduce the tested air leakage to 4.0 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a high efficiency fan (maximum 0.35 watts/cfm) (not interlocked with the furnace fan). Ventilation systems using a furnace including an ECM motor are allowed, provided that they are controlled to operate at low speed in ventilation only mode. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage.</p>	0.5
2b	<p>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2b: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the International Residential Code shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.70. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</p>	1.0
2c	<p>AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2c: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the International Residential Code shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.85. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</p>	1.5
3a	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3a: Gas, propane or oil-fired furnace with minimum AFUE of 95% **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	0.5
3b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3b: Air-source heat pump with minimum HSPF of 8.5 **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.0
3c	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3c: Closed-loop ground source heat pump; with a minimum COP of 3.3 or Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6 **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	2.0

3d	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3d: DUCTLESS SPLIT SYSTEM HEAT PUMPS, ZONAL CONTROL: In homes where the primary space heating system is zonal electric heating, a ductless heat pump system shall be installed and provide heating to at least one zone of the housing unit. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.0
4	<p>HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM:a All heating and cooling system components installed inside the conditioned space. All combustion equipment shall be direct vent or sealed combustion. Locating system components in conditioned crawl spaces is not permitted under this option. Electric resistance heat is not permitted under this option. Direct combustion heating equipment with AFUE less than 80% is not permitted under this option. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and shall show the location of the heating and cooling equipment and all the ductwork.</p>	1.0
5a	<p>EFFICIENT WATER HEATING 5a: Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.62 or Electric water heater with a minimum EF of 0.93. and for both cases All showerhead and kitchen sink faucets installed in the house shall be rated at 1.75 GPM or less. All other lavatory faucets shall be rated at 1.0 GPM or less.b **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and shall specify the maximum flow rates for all showerheads, kitchen sink faucets, and other lavatory faucets.</p>	0.5
5b	<p>EFFICIENT WATER HEATING 5b: Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.82 or Solar water heating supplementing a minimum standard water heater. Solar water heating will provide a rated minimum savings of 85 therms or 2000 kWh based on the Solar Rating and Certification Corporation (SRCC) Annual Performance of OG-300 Certified Solar Water Heating Systems or Electric heat pump water heater with a minimum EF of 2.0 and meeting the standards of NEEA's Northern Climate Specifications for Heat Pump Water Heaters or Water heater heated by ground source heat pump meeting the requirements of Option 3c. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.</p>	1.5
6	<p>RENEWABLE ELECTRIC ENERGY: For each 1200 kWh of electrical generation provided annually by on-site wind or solar equipment a 0.5 credit shall be allowed, up to 3 credits. Generation shall be calculated as follows: For solar electric systems, the design shall be demonstrated to meet this requirement using the National Renewable Energy Laboratory calculator PVWATTS. Documentation noting solar access shall be included on the plans. For wind generation projects designs shall document annual power generation based on the following factors: The wind turbine power curve; average annual wind speed at the site; frequency distribution of the wind speed at the site and height of the tower. **To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the photovoltaic or wind turbine equipment type, provide documentation of solar and wind access, and include a calculation of the minimum annual energy power production.</p>	0.5

a. **Interior Duct Placement.** Ducts included as Option 4 of Table R406.2 shall be placed wholly within the heated envelope of the housing unit. The placement shall be inspected and certified to receive the credits associated with this option.

Exception: Ducts complying with this section may have up to 5% of the total linear feet of ducts located in the exterior cavities or buffer spaces of the dwelling. If this exception is used the ducts will be tested to the following standards:

Post-construction test: Leakage to outdoors shall be less than or equal to 1 CFM per 100 ft² of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

b. **Plumbing Fixtures Flow Ratings.** Low flow plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following requirements:

1. Residential bathroom lavatory sink faucets: Maximum flow rate - 3.8 L/min (1.0 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.
2. Residential kitchen faucets: Maximum flow rate - 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.
3. Residential showerheads: Maximum flow rate - 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.

Whole House Ventilation (Prescriptive) IRC Sec. M1507.3 Whole-House Ventilation

Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.7.

Please check the appropriate box to describe which of the four prescriptive Whole House Ventilation Systems you will be using.

Indicate Continuous or Intermittent and provide Run Time % _____ (see Table M1507.3.3(2))

- 1. Whole House Ventilation Using Exhaust Fans & Outdoor Air Inlets. (M1507.3.4)
- 2. Whole House Ventilation Integrated with a Forced Air System. (M1507.3.5)
- 3. Whole House Ventilation using a Supply Fan. (M1507.3.6)
- 4. Whole House Ventilation Using a Heat Recovery Ventilation System (M1507.3.7)

TABLES FOR USE WITH CALCULATING WHOLE HOUSE VENTILATION OPTIONS

Table M1507.3.3(1)

CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 - 3,000	45	60	75	90	105
3,001 - 4,500	60	75	90	105	120
4,501 - 6,000	75	90	105	120	135
6,001 - 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

TABLE M1507.3.3(2)

INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS^{a, b}

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor ^a	4	3	2	1.5	1.3	1.0

- a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
- b. Extrapolation beyond the table is prohibited.

See modified Tables M1507.3.3(1) implementing Intermittent factors shown in Table M1507.3.3(2)—on next page.

IRC Table M1507.3.6.2: Prescriptive Supply Fan Duct Sizing

Supply Fan Tested at 0.40" W.G.

Specified Volume from Table M1507.3.3(1)	Minimum Smooth Duct Diameter	Minimum Flexible Duct Diameter
50 - 90 CFM	4 inch	5 inch
90 - 150 CFM	5 inch	6 inch
150 - 250 CFM	6 inch	7 inch
250 - 400 CFM	7 inch	8 inch

Source Specific Exhaust Ventilation

Required in each kitchen, bathroom, water closet compartment, laundry room, indoor swimming pool, spa and other rooms where water vapor or cooking odor is produced.

TABLE M1507.4

MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms—toilet rooms Laundry rooms Indoor swimming pools & spas	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m³/s.

The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2)

MODIFIED TABLE M1507.3.3(1)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS
 Using Table M1507.3.3(2) Factor of 4 for 25%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	120	180	240	300	360
1,501 - 3,000	180	240	300	360	420
3,001 - 4,500	240	300	360	420	480
4,501 - 6,000	300	360	420	480	540
6,001 - 7,500	360	420	480	540	600
> 7,500	420	480	540	600	660

MODIFIED TABLE M1507.3.3(1)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS
 Using Table M1507.3.3(2) Factor of 3 for 33%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	90	135	180	225	270
1,501 - 3,000	135	180	225	270	315
3,001 - 4,500	180	225	270	315	360
4,501 - 6,000	225	270	315	360	405
6,001 - 7,500	270	315	360	405	450
> 7,500	315	360	405	450	495

MODIFIED TABLE M1507.3.3(1)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS
 Using Table M1507.3.3(2) Factor of 2 for 50%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	60	90	120	150	180
1,501 - 3,000	90	120	150	180	210
3,001 - 4,500	120	150	180	210	240
4,501 - 6,000	150	180	210	240	270
6,001 - 7,500	180	210	240	270	300
> 7,500	210	240	270	300	330

MODIFIED TABLE M1507.3.3(1)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS
 Using Table M1507.3.3(2) Factor of 1.5 for 66%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	45	67.5	90	112.5	135
1,501 - 3,000	67.5	90	112.5	135	157.5
3,001 - 4,500	90	112.5	135	157.5	180
4,501 - 6,000	112.5	135	157.5	180	202.5
6,001 - 7,500	135	157.5	180	202.5	225
> 7,500	157.5	180	202.5	225	247.5

MODIFIED TABLE M1507.3.3(1)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS
 Using Table M1507.3.3(2) Factor of 1.3 for 75%

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				
< 1,500	39	58.5	78	97.5	117
1,501 - 3,000	58.5	78	97.5	117	136.5
3,001 - 4,500	78	97.5	117	136.5	156
4,501 - 6,000	97.5	117	136.5	156	175.5
6,001 - 7,500	117	136.5	156	175.5	195
> 7,500	136.5	156	175.5	195	214.5

Simple Heating System Size

(Electronic version available at: http://www.energy.wsu.edu/Documents/Heat_Sizing_code%20specs_final.xlsx)

This heating system sizing calculator is based on the Prescriptive Requirements of the 2012 Washington State Energy Code (WSEC) and ACCA Manuals J and S. This calculator will calculate heating loads only. ACCA procedures for sizing cooling systems should be used to determine cooling loads.

The glazing (window) and door portion of this calculator assumes the installed glazing and door products have an area weighted average U-factor of 0.30. The incorporated insulation requirements are the minimum prescriptive amounts specified by the 2012 WSEC.

Please fill out all of the green drop-downs and boxes that are applicable to your project. As you make selections in the drop-downs for each section, some values will be calculated for you. If you do not see the selection you need in the drop-down options, please call the WSU Energy Extension Program at (360) 956-2042 for assistance.

Project Information

[Green input boxes for Project Information]

Contact Information

[Green input boxes for Contact Information]

Heating System Type:

Forced Air Furnace Heat Pump

To see detailed instructions for each section, place your cursor on the word "Instructions".

Design Temperature

City: Sammamish—26 degrees F.

Design Temperature Difference (ΔT)
 $\Delta T = \text{Indoor (70 degrees)} - \text{Outdoor Design Temp}$

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Area of Building

Conditioned Floor Area

[Instructions](#) Conditioned Floor Area (sq ft)

[Green input box]

Average Ceiling Height

[Instructions](#) Average Ceiling Height (ft)

[Green input box]

Conditioned Volume

Glazing and Doors

[Instructions](#)

U-Factor X Area = UA
0.30 [Green input box] [White input box]

Insulation

Attic

R-value: R-49 (U-0.026) or R-38 Advanced (U-0.026)

U-Factor X Area = UA
[White input box] [Green input box] [White input box]

Single Rafter or Joist Vaulted Ceilings

R-Value: R-38 (U-0.027) vented or no vaulted ceilings

U-Factor Area UA
[White input box] [Green input box] [White input box]

Above Grade Walls (see Figure 1)

R-Value: R-21 (U-0.056)

U-Factor Area UA
[White input box] [Green input box] [White input box]

Floors

R-Value: R-30 (U-0.029) or no floors above unconditioned space

U-Factor Area UA
[White input box] [Green input box] [White input box]

Below Grade Walls (see Figure 1)

R-Value: R-21 (U-0.042) interior or R-10 continuous exterior (U-0.064) or no below grade walls.

U-Factor Area UA
[White input box] [Green input box] [White input box]

Slab Below Grade (see Figure 1)

Conditioning: R-5 thermal break at slab edge (F-0.570), or no slab below grade

F-Factor Length UA
[White input box] [Green input box] [White input box]

Slab on Grade (see Figure 1)

R-Value: R-10 perimeter (F-0.540) or R-10 fully insulated (F-0.360), or no slab on grade.

F-Factor Length UA
[White input box] [Green input box] [White input box]

Location of Ducts

Conditioned (1.0) or unconditioned space (1.10).

Duct Leakage Coefficient

[White input box]

Sum of UA

Envelope Heat Load

Sum of UA X ΔT

_____ Btu / Hour

Air Leakage Heat Load

Volume X 0.6 X ΔT X .018

_____ Btu / Hour

Building Design Heat Load

Air Leakage + Envelope Heat Loss

_____ Btu / Hour

Building and Duct Heat Load

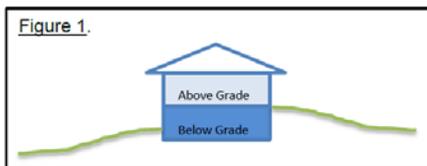
Ducts in unconditioned space: Sum of Building Heat Loss X 1.10
Ducts in conditioned space: Sum of Building Heat Loss X 1

_____ Btu / Hour

Maximum Heat Equipment Output

Building and Duct Heat Loss X 1.40 for Forced Air Furnace
Building and Duct Heat Loss X 1.25 for Heat Pump

_____ Btu / Hour



F-Factor: the perimeter heat loss factor for slab on grade floors (WSEC Chp 2 definition + formula)

U-Factor: the reciprocal of R-value

Duct Leakage Affidavit –New Construction

(Electronic version available at: http://www.energy.wsu.edu/Documents/Duct%20Leakage%20affidavit%20new%20construction%201_29_12.pdf)



Duct Leakage Affidavit (New Construction)

Permit #: _____

House address or lot number: _____

City: _____ Zip: _____

Cond. Floor Area (ft²): _____ Source (circle one): Plans Estimated Measured

Duct tightness testing is not required. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope. Ducts located in crawl spaces do not qualify for this exception.

Air Handler in conditioned space? yes no Air Handler present during test? yes no

Circle Test Method: Leakage to Outside Total Leakage

Maximum duct leakage:

Post Construction, total duct leakage: (floor area x .04) = _____ CFM@25 Pa

Post Construction, leakage to outdoors: (floor area x .04) = _____ CFM@25 Pa

Rough-In, total duct leakage with air handler installed: (floor area x .04) = _____ CFM@25 Pa

Rough-In, total duct leakage with air handler not installed: (floor area x .03) = _____ CFM@25 Pa

Test Result: _____ CFM@25Pa

Ring (circle one if applicable): Open 1 2 3

Duct Tester Location: _____ Pressure Tap Location: _____

I certify that these duct leakage rates are accurate and determined using standard duct testing protocol.

Company Name: _____ Technician: _____

Technician Signature: _____

Date: _____

Phone Number: _____

Duct Leakage Affidavit –Existing Construction(Electronic version available at: http://www.energy.wsu.edu/Documents/Duct%20Leakage%20affidavit%20existing%201_29-12.pdf)**Energy Code**
*S u p p o r t*WASHINGTON STATE UNIVERSITY
EXTENSION ENERGY PROGRAM**Duct Leakage Test Results (Existing Construction)**

Permit #: _____

House address or lot number: _____

City: _____ Zip: _____

Cond. Floor Area (ft²): _____ Duct tightness testing is not required for this residence per exceptions listed at the end of this document**Test Result:** _____ CFM@25Pa

Ring (circle one): Open 1 2 3

Duct Tester Location: _____

Pressure Tap Location: _____

I certify that these duct leakage rates are accurate and determined using standard duct testing protocol

Company Name: _____

Duct Testing Technician: _____

Technician Signature: _____ Date: _____

Phone Number: _____

Washington State Energy Code Reference:

R101.4.3.1 Mechanical Systems: When a space-conditioning system is altered by the installation or replacement of space-conditioning equipment (including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger), the duct system that is connected to the new or replacement space-conditioning equipment shall be tested as specified in RS-33. The test results shall be provided to the building official and the homeowner.

Exceptions:

1. Duct systems that are documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in RS-33.
2. Ducts with less than 40 linear feet in unconditioned spaces.
3. Existing duct systems constructed, insulated or sealed with asbestos.
4. Additions of less than 750 square feet.

Certificate (Electronic version available at: http://www.energy.wsu.edu/Documents/WSEC-2012-Avery-6573_2_Per_Sheet.pdf)

(Quarter size and half size certificate label formats are available from the WSU-Energy web site link.)

A permanent certificate shall be posted within three feet of the electrical distribution panel. The certificate shall be completed by the builder or registered design professional and include all of the information as follows:

2012 WSEC Residential Energy Compliance Certificate

Property Address: _____

Conditioned Floor Area: _____ **Date:** ____ / ____ / ____

Builder or registered design professional :

Signature: _____

R-Values

Ceiling: Vaulted R-____ **Floors:** Over unconditioned space R-____
 Attic R-____ Slab on grade floor R-____

Walls: Above grade R-____ **Doors:** _____ R-____
 Below, int. R-____ _____ R-____
 Below, ext. R-____ _____ R-____

U-Factors and SHGC

NFRC rating (or)	Windows	U-____	SHGC- <u>N/A</u>
Default rating (Appendix A WSEC 2012)	Skylights	U-____	SHGC- <u>N/A</u>

Table 406.2 Option(s) _____ **Total 406.2 Credits** _____

Heating, Cooling & Domestic Hot Water

System	Type	Efficiency
Heating		
Cooling		
DHW		

Duct & Building Air Leakage

All ducts & HVAC in conditioned space (yes / no) Insulation R-____

Air handler present (yes / no)

Test Target _____ CFM@25Pa Test Result _____ CFM@25Pa

Building air leakage target: ACH₅₀ < 5.0 - Tested leakage: ACH₅₀ = _____

Onsite Renewable Energy Electric Power System

System type: _____ Rated annual generation _____ **Kwh**